PATENT ABSTRACTS OF JAPAN

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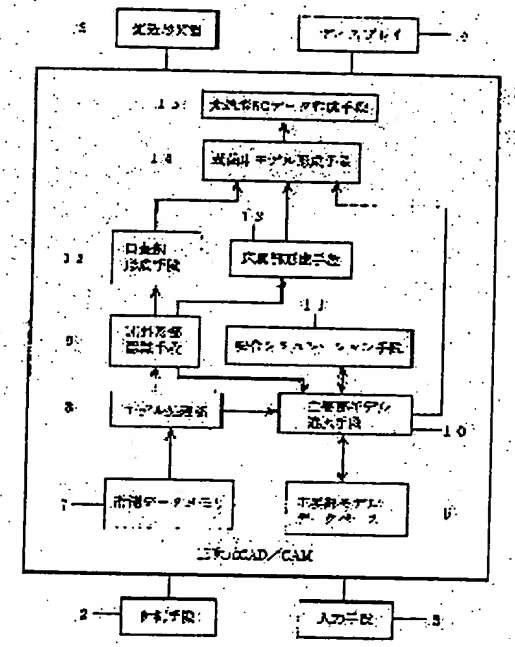
(72)Inventor : KOGURE YAMAHITO

(54) MANUFACTURE OF DENTAL PLATE

(57)Abstract:
PROBLEM TO BE SOLVED: To suppress the variation in the quality of dental plates by forming dental plate shape data in accordance with main part model data and pattern shape data selected from a data base and photomodeling the dental plates in accordance with this shape data.
SOLUTION: An impression pattern is formed this impression pattern is measured by a measuring means 2 and, then, a pattern model is formed. A means 9 for recognizing the external shape of the dental plate determines its external shape. A means 10 for selecting the main part model selects the desired main part model. A means 12 for forming a palate part forms a palate plate part. A means 13 for forming the extension plate forms the extension plate. The dental plate model is formed by connecting the gingiva, palate and extension plate of the main part model. A means 15 for forming NC data for photomodeling forms NC data in accordance with the dental plate model. As a result, the quality is made uniform.



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CLAIMS

[Claim(s)]
[Claim 1] The manufacture approach of the plate characterized by measuring the model by the impression, choosing a principal part model from a database based on the configuration data of this model, creating plate configuration data based on this principal part model data and said model configuration data, and controlling Mitsuzo form equipment based on this configuration data.
[Claim 2] The manufacture approach of the plate characterized by to measure the model by the impression, to transmit this measurement data to a management pin center,large from a dental clinic or an artisan place, to create the configuration data of the plate based on the configuration data of a model in the management pin center,large, to create NC data based on this configuration data, to transmit this NC data to a dental clinic or an artisan place, to control Mitsuzo form equipment by the dental clinic or the artisan place, and to manufacture the plate.

[Translation done.]

DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Industrial Application] This invention relates to the manufacture approach of the plate.
[0002]
[Description of the Prior Art] Conventionally, in order to manufacture the plate, the impression of the mandible which is an anodontia, for example, maxilla and its antagonistic tooth, side in the oral cavity is ****(ed). Next, dental plaster is poured in into an impression and the model of a mandible is manufactured a top. While seeing the bottom involution relation of Gokami and arranging an artificial tooth on the model of a maxilla, gum formation is carried out and a trial denture is created. Subsequently, a trial denture is buried with gypsum fibrosum in a flask, and melting discharge of the wax is carried out after gypsum-fibrosum hardening. Thereby, while having the cavity of the plate configuration of wax, and isomorphism, the plaster mold with which the artificial tooth was fixed is manufactured. An injection-molding method, compression forming, etc. are suitably filled up with synthetic resin by the approach in said cavity after this, after resin hardening, a plaster mold is crushed and mold goods are taken out, and polish and finishing are given and it completes. Thus, in order to have manufactured the plate, while creating the trial denture, the plaster mold had to be created according to this trial denture, shaping of resin, or shaping and a polymerization had to be performed further, and indexing of mold goods had to be performed.
[0003]
[Problem(s) to be Solved by the Invention] Since a dental technician is what arranges an artificial tooth, and carries out gum formation on a model using the articulator etc., and creates a trial denture in the above-mentioned conventional technique, the place undertaken to technical force, such as a dental technician engaged in the manufacture, is large, the quality of the plate has the variation in the quality by the difference of a dental technician's etc. level of skill, and a setup of a quality standard is difficult for it. In recent years, research which manufactures orthoprosthesis using a three-dimensions system is advanced, and it is in the inclination for this to attain improvement-ization in homogeneity of quality. For example, carry out direct camera photography of the inside of the oral cavity, and processing data are created based on this photography image. The thing which manufactures an inlay and an onlay, or the approach of manufacturing a crown-prosthesis object using a three-dimensions system **** the impression of abutments, and its perimeter and antagonistic tooth, pour in and stiffen the anhydrite for dentistries in an impression, manufacture a model, and the configuration of this model is measured with a three-dimensions measurement technique. Store the data of the treated gear tooth and its perimeter in a computer, and a three dimensional object model is created from the data. The general prosthetic appliance configuration chosen as this three dimensional object model from databases Superposition, That general configuration is deformed so that the configuration and function which are needed in a duplicate may be suited, NC data of this configuration that deformed are created, and what manufactures a crown-prosthesis object is proposed by controlling NC maneuvers machines, such as a milling machine, by this NC data. However, each of these things was the manufacture approaches of crown parts, such as crown, an inlay, and an onlay, and it was difficult not to take the plate into consideration and to manufacture the plate with the above-mentioned technique.
[0004] Then, this invention aims at offering the manufacture approach of the plate which controls the variation in quality and can improve.

[0005]
[Means for Solving the Problem] In order to solve the above-mentioned technical problem, the manufacture approach of the plate of this invention measures the model by the impression, chooses a principal part model from a database based on the configuration data of this model, creates plate configuration data based on this principal part model data and said model configuration data, and controls Mitsuzo form equipment based on this configuration data. Moreover, this invention measures the model by the impression, transmits this measurement data to a management pin center,large from a dental clinic or an artisan place, it creates the configuration data of the plate based on the configuration data of a model in the management pin center,large, creates NC data based on this configuration data, transmits this NC data to a dental clinic or an artisan place, controls Mitsuzo form equipment by the dental clinic or the artisan place, and manufactures the plate.
[Function] According to this invention, based on the principal part model data and model configuration data which were chosen from the database, plate configuration data are created and the Mitsuzo form of the plate is carried out based on this configuration data. Moreover, according to this invention, the model measurement data based on an impression are obtained in a dental clinic or an artisan place, NC data of plate configuration data are created in the management pin center,large, and the Mitsuzo form of the plate is carried out in a dental clinic or an artisan place.
[0006]
[Example] Hereafter, the example of this invention is explained with reference to an accompanying drawing. Drawing 1 is the example of the equipment constituted in order to manufacture the plate, and serves as 3-dimensional CAD / CAM1, the measurement means 2, Mitsuzo form equipment 3, and a display 4 from the input means 5. 3-dimensional CAD / CAM1 consists of the database 6 of the principal part model which consists of an artificial tooth and the gum section at least, the measurement data memory 7, the model processing section 8, the floor appearance section recognition means 9, the principal part model-selection means 10, the occlusion simulation means 11, the opening covering device means forming 12, floor vane means forming 13, plate model means forming 14, and a Mitsuzo form NC data origination means 15. According to various specifications, grouping of many principal part models is carried out to a database 6, and they are stored in it. The model processing section 8 creates the surface model which is model configuration data from the three-dimensions coordinate value measurement data obtained by the measurement means 2. The floor appearance section recognition means 9 recognizes the configuration of the floor appearance section according to a surface model. The principal part model-selection means 10 selects the principal part model which suits most based on said surface model from a database 6. The occlusion simulation means 11 determines the location of a principal part model in relation with model configuration data. The opening covering device means forming 12 forms the opening covering device of predetermined thickness according to the basal surface configuration of a model in the range of the floor appearance section recognized by the floor appearance section recognition means 9. The floor vane means forming 13 forms a floor vane according to the floor appearance section recognized by the floor appearance section recognition means 9. The plate model means forming 14 connects the gum section, said opening covering device, and said floor vane of the selected principal part model, and forms the surface model of the plate. In this case, the model of the plate means the geometric model data which consist of a floor and an artificial tooth, or the geometric model data of only a floor. The Mitsuzo form NC data origination means 15 manufactures the data which control Mitsuzo form equipment 3. When the proper equipment which can input measurement data into the measurement data memory 7 can be used, for example, it uses the three dimensional measurer of a contact process or a non-contact type, impression making of it is carried out as usual, and it pours in and stiffens the anhydrite for dentistries in this impression, and creates a model, and the measurement means 2 forms the SABE line of the plate appearance section in this model, measures the configuration of this model by the three dimensional measurer, and stores it in the measurement data memory 7. In this case, as for measurement data, it is desirable to store as data which wireframe-ized sequence-of-points data and performed smoothing processing. the case where CAT is used -- the same -- said model -- a connoisseur -- it stores in the measurement data memory 7 as three-dimensions data measured by the method. the principal part of the denture which arranged the artificial tooth in the principal part model database 6, and carried out gum formation -- a clinical example -- responding -- a large number manufacture -- carrying out -- the three dimensional measurer above-mentioned [this] -- measuring -- three-dimensions coordinate value data -

– obtaining –– this three-dimensions coordinate value data –– being based –– 3-dimensional CAD/CAM –– using –– a connoisseur –– configuration data, such as a surface model created by the method, are stored. And many fixtures which arranged the artificial tooth according to each model are prepared, and this fixture is set in Mitsuzo form equipment 3. As shown in drawing 3 , while forming Mitsuzo form equipment 3 possible [rise and fall of the Z-axis elevator 18] in the tub 17 which contained the photo-setting resin 16, it is constituted so that the laser 21, such as ultraviolet rays, may be irradiated from the laser head 20 of the XY scanner 19, and the fixture 23 mentioned already is attached in the table 22 of the Z-axis elevator 18 removable through the centering-control device 24. Drawing 4 shows an example of the centering-control device 24, and has the fixture 23 manufactured by the female mold with gypsum fibrosum etc. according to the artificial-tooth arrangement condition of a principal part model, and the artificial tooth 25 is inserted in this fixture 23. It is contained by the case 26, and the rail 27 for X shaft orientations in a case 26, the delivery screw 28, and a pulse motor 29 are formed through a frame 30, and the rail 31 for Y shaft orientations, the delivery screw 32, and a pulse motor 33 are formed through frame 35A, and the fixture 23 is formed through the frame which the rail 34 for Z shaft orientations, the delivery screw 35, and a pulse motor 36 do not illustrate. The fixture 23 and the centering-control device 24 which were mentioned above are established to for example, the anterior-tooth section, the left-hand side molar section, and the right-hand side molar section, respectively, and can be adjusted now according to an individual. And said pulse motors 29, 33, and 36 are controlled according to the migration location of said principal part model adjusted with the occlusion simulation means 11. Operating it with the interactive mode with the contents of a display of a display 4 in this example, the procedure in the case of manufacturing the partial floor 37 of the maxilla shown in drawing 12 creates the models 38 and 39 of a mandible, when based on the impression shown in drawing 5 , it forms the SABE line 40 of the plate appearance section in a chamfer, measures models 38 and 39 by the three dimensional measurer which is the measurement means 2, and inputs three-dimensions coordinate value data into the measurement data memory 7. Moreover, specification data, such as a class of said partial denture 37, a part of anodontia, magnitude of the artificial tooth to be used, and a class, are inputted with the input means 5. Next, the model processing section 8 creates a wireframe model from measurement data, and creates the model models 41 and 42 which consist of a surface model further. Next, the floor appearance section recognition means 9 determines the appearance section configuration of the plate according to the configuration data of the SABE line 40 in said model model 41. Next, with the occlusion simulation means 11, the principal part model-selection means 10 performs simulation of **** doubling between the model models 42 of the mandible which is a residual gear tooth, and selects the principal part model 43 which carries out occlusion most, doubling with the residual-ridge configuration of a maxilla, as shown in drawing 6 , and determines the location of the principal part model 43 while it reads two or more principal part models in the group chosen based on specification data one by one. This principal part model 43 consists of an artificial tooth 44 and the gum section 45 at least. Next, the opening covering device means forming 12 creates the opening covering device 46 which has predetermined thickness according to the basal surface configuration of the model model 41 of a maxilla in the range of the plate appearance section as shown in drawing 8 . Next, the floor vane means forming 13 creates the plate appearance section and the floor vane 47 which has predetermined thickness according to the basal surface configuration, as shown in drawing 9 . Next, the plate model means forming 14 is drawing 11 about the gum section 45, said opening covering device 46, and said floor vane 47 of said selected principal part model 43. While connecting like ******, the plate model 48 which is a surface model as shown in drawing 10 is created by excising the gum section 45 of a principal part model according to the residual-ridge configuration of the model model 41. The model 48 in this case shows the configuration data which consist of a floor and an artificial tooth. The Mitsuzo form NC data origination means 15 creates control data according to said plate model 48. It is set, where the fixture 23 which arranged the artificial tooth 44 according to the model chosen as the table 22 of the Z-axis elevator 18 of Mitsuzo form equipment 3 was attached and a fixture 23 is determined by control of the centering-control device 24 in occlusion simulation. The plate is manufactured, when laser 21 is irradiated one by one in this condition and a table 22 descends. In this case, since the laser irradiated with the data of an artificial-tooth configuration irradiates the set artificial tooth, resin shaping also of the interdental-papilla section between artificial teeth is carried out finely. Although polish and finishing processing are performed after this and it considers as a product, occlusion ****** of an artificial tooth is performed as occasion demands. Thus, since measure the model by the impression, the principal part model which consists of an

artificial tooth and the gum section at least based on the configuration data of this model is chosen from a database, plate configuration data are created based on this principal part model data and said model configuration data and Mitsuzo form equipment is controlled by the above-mentioned example based on this configuration data, equalization of the quality of the plate can be attained. Moreover, a manufacture process also decreases compared with the former and increase in efficiency can also be attained. If drawing 13 and drawing 14 show other examples, and give the same sign to the same part as the above-mentioned example and explanation of the same part is omitted and explained, it is the system constituted in order that drawing 13 might manufacture the plate, and the management pin center,large 51, the dental clinic 52, or the artisan place is connected by the communication lines 55, such as the telephone line, through I/O devices 53 and 54. The dental clinic 52 or the artisan place is equipped with the data-processing means 1 which consists of a personal computer etc., the measurement means 2, Mitsuzo form equipment 3, the display 4, and the input means 5. The management pin center,large 51 is equipped with the 3-dimensional CAD / CAM56 which consists of an image workstation, the input means 57, and the display 58. To 3-dimensional CAD / CAM56 The database 6 of the principal part model which consists of an artificial tooth and the gum section at least, The measurement data memory 7, the model processing section 8, and the floor appearance section recognition means 9, It consists of the principal part model-selection means 10, the occlusion simulation means 11, the opening covering device means forming 12, floor vane means forming 13, denture model means forming 14, and a Mitsuzo form NC data origination means 15. For example, the procedure in the case of manufacturing the partial denture 37 of a mandible shown in drawing 12 creates the models 38 and 39 of a mandible, when being based on the impression shown in drawing 5 in a dental clinic 52 or an artisan place, as shown in drawing 14 , it forms the SABE line 40 of the plate appearance section, measures models 27 and 28 by the three dimensional measurer which is the measurement means 2, obtains three-dimensions coordinate value data, and stores them in the memory of the data-processing means 1. Moreover, specification data, such as a class of partial denture 37, a part of the anodontia section, magnitude of the artificial tooth to be used, and a class, are inputted with the input means 5. And said measurement data and attribute data are transmitted to the management pin center,large 51 by the communication line 55 from a dental clinic 52 or an artisan place through I/O devices 53 and 54. In the management pin center,large 51, this is received and measurement data are memorized in the memory which does not illustrate attribute data to the measurement data memory 7. In the management pin center,large 51, the model processing section 8 creates a wireframe model from measurement data, and creates the model models 41 and 42 which consist of a surface model further. Hereafter, the plate model 48 which is a surface model like the above-mentioned example is created. The Mitsuzo form data origination means 15 creates NC data according to said plate model 48. And NC data are transmitted to a dental clinic 52 or an artisan place from the management pin center,large 51 by the communication line 55. In a dental clinic 52 or an artisan place, the plate is manufactured by controlling Mitsuzo form equipment 3 like the above-mentioned example. Thus, in this example, manufacture of the plate by the three-dimensions system is enabled, and the variation in quality can be controlled. Moreover, since what is necessary is just to equip a management pin center,large with expensive 3-dimensional CAD/CAM, the economic burden of a dental clinic and an artisan place is mitigable. Although each above-mentioned example explained the partial floor of a maxilla to the example, it is also possible to manufacture the partial floor of a mandible in the same procedure. moreover, when there is a partial floor which carries out involution to a mandible a top After the occlusal equilibration is beforehand carried out from the principal part database 6, the partial floor model of a mandible is chosen. That what is necessary is to connect the gum section, said opening covering device, and said floor vane of said principal part model, and just to create the plate model which is a surface model What is necessary is just to create the plate model of a mandible which the principal part model of a floor is all chosen, and the gum section, said opening covering device, and said floor vane of this principal part model are connected, and is a surface model, after the occlusal equilibration is similarly carried out beforehand from the principal part model database 6 in the complete denture. Moreover, the occlusal equilibration of the plate manufactured in this way is carried out, and it grinds and finishes. furthermore, the plate which carried out the Mitsuzo form as mentioned above -- as it is -- as a denture -- not finishing -- the plate of the Mitsuzo form -- as a master model -- using -- the impression of this -- ****(ing) -- this impression -- a wax -- slushing -- the wax plate -- manufacturing -- a connoisseur -- this wax plate may be permuted by resin or the metal by the method, and the plate of the product made of resin or metal may be manufactured. Moreover, what

is necessary is just to enable it to set the clasp to a fixture 23 with an artificial tooth, when preparing the clasp if needed. Moreover, although the above-mentioned example explained the case where an artificial tooth was set in Mitsuzo form equipment to the example, the plate is fabricated without setting an artificial tooth, you may make it paste up an artificial tooth on a floor after that, and the fixture and centering-control device which were shown in drawing 4 in this case can be omitted. In addition, as for the principal part model data registered into a principal part model database, it is desirable to make it what combined the floor configuration data which have artificial-tooth configuration data and an artificial-tooth insertion crevice in this case, and the configuration data of only the floor which has an artificial-tooth insertion crevice are created in plate model means forming.

[0007]

[Effect of the Invention] This invention can control the variation in the quality of the plate.

[Translation done.]

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]
[Drawing 1] It is the block diagram showing the example of this invention.
[Drawing 2] It is a flow chart Fig.
[Drawing 3] It is the approximate account Fig. showing Mitsuzo form equipment.
[Drawing 4] It is the approximate account Fig. showing a fixture and a centering-control device.
[Drawing 5] It is the top view showing the model which an impression twists.
[Drawing 6] It is the explanatory view showing an occlusion simulation condition.
[Drawing 7] It is the top view showing a principal part model selection condition.
[Drawing 8] It is the top view showing an opening covering device formation condition.
[Drawing 9] It is the top view showing a floor vane formation condition.
[Drawing 10] It is the top view showing a plate formation condition.
[Drawing 11] It is the explanatory view showing a plate formation condition.
[Drawing 12] It is the perspective view showing the plate.
[Drawing 13] It is the block diagram showing other examples of this invention.
[Drawing 14] It is a flow chart Fig.
[Description of Notations]
1 3-dimensional CAD/CAM
2 Measurement Means
3 Mitsuzo Form Equipment
6 Principal Part Database
10 Principal Part Model-Selection Means
14 Plate Means Forming

[Translation done.]

* NOTICES *

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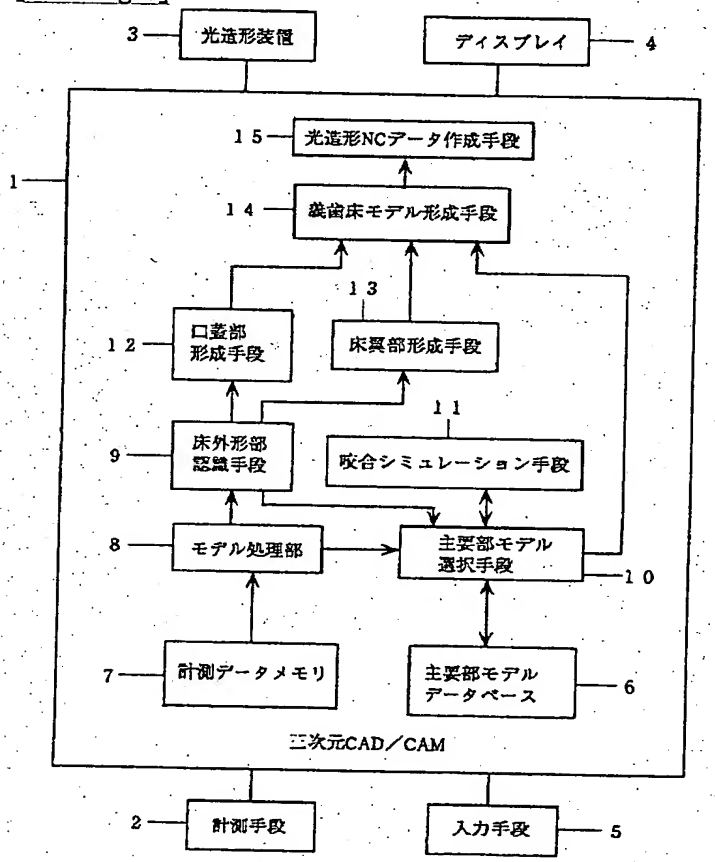
1.This document has been translated by computer. So the translation may not reflect the original precisely.

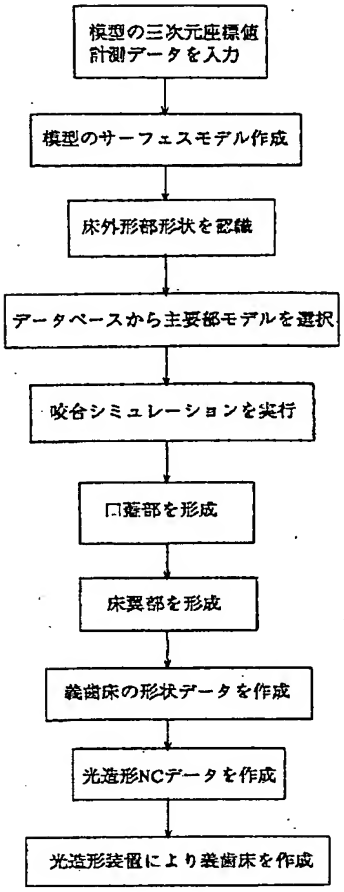
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

DRAWINGS

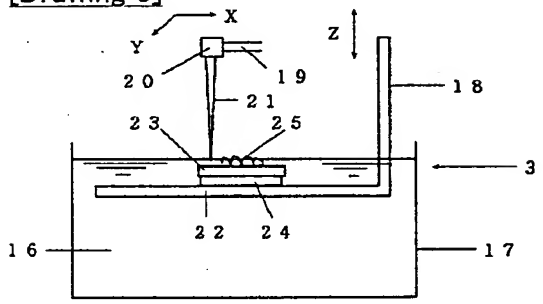
[Drawing 1]



[Drawing 2]



[Drawing 3]



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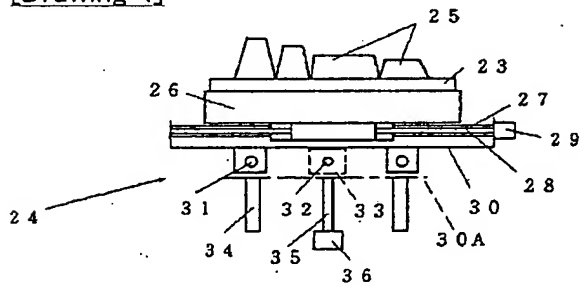

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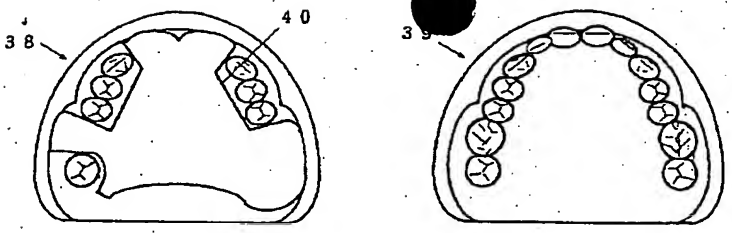
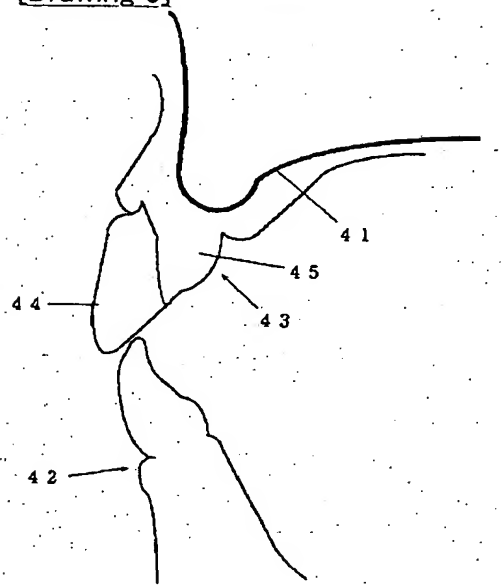
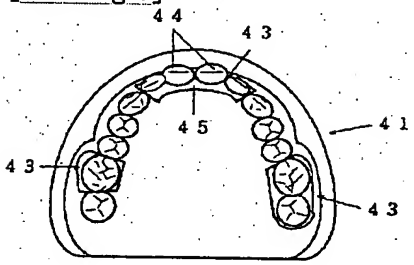


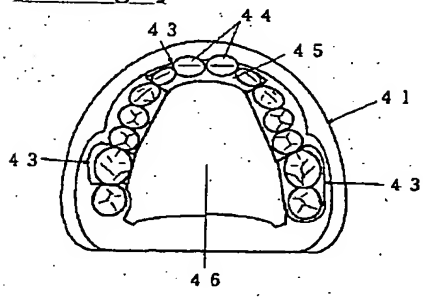
[Drawing 6]



[Drawing 7]



[Drawing 8]



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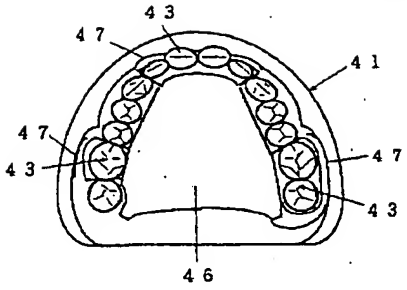

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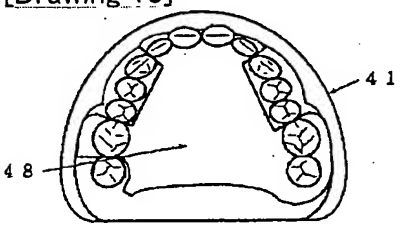

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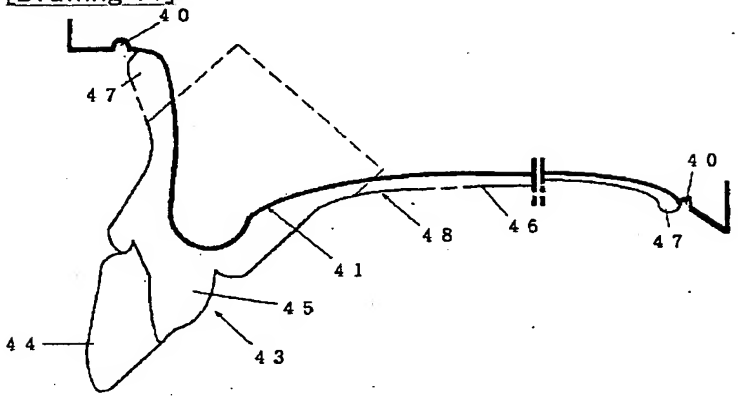
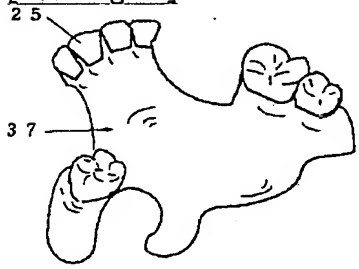
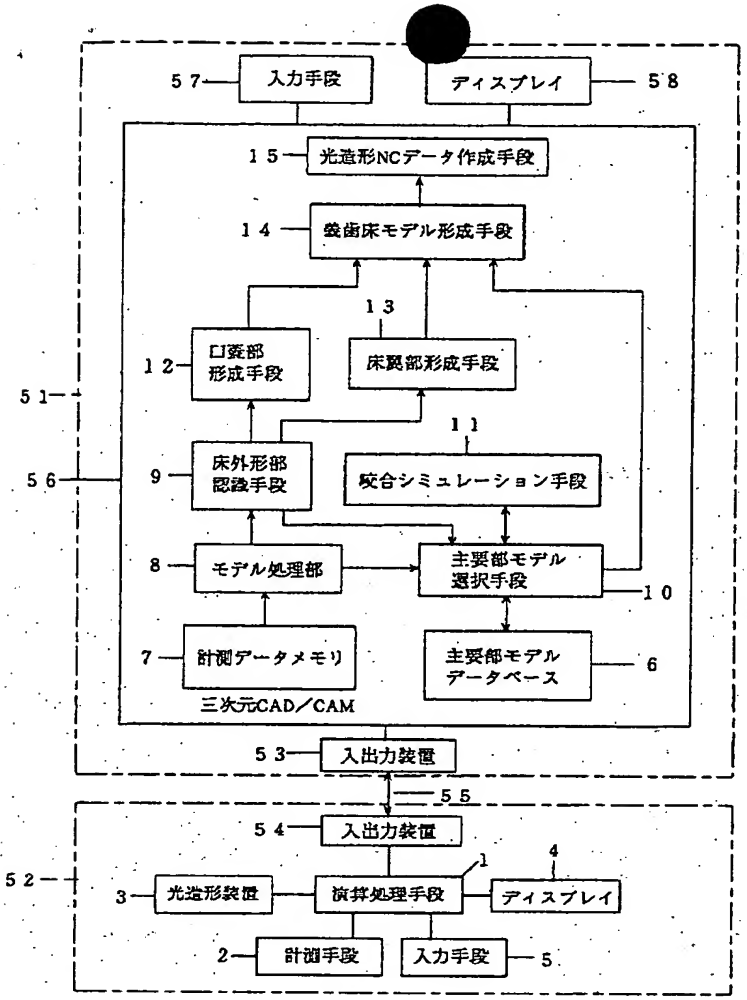


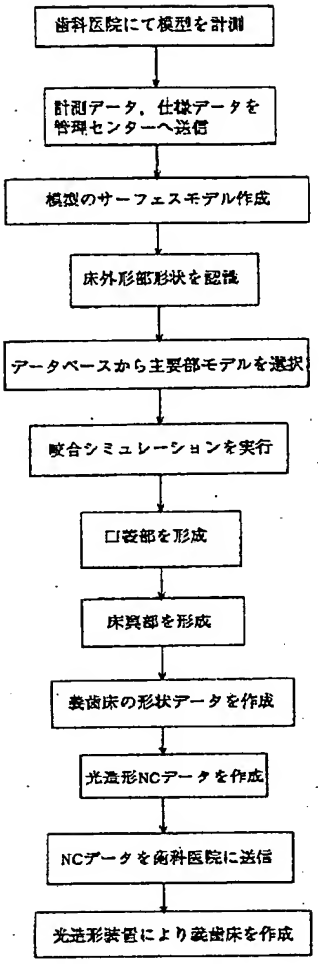
[Drawing 12]



[Drawing 13]


57
入力手段
ディスプレイ
58
15
光造形NCデータ作成手段
14
義歯床モデル形成手段
13
12
口蓋部
形成手段
床異部形成手段
51
11
56
9
床外形部
認識手段
咬合シミュレーション手段
8
モデル処理部
主要部モデル
選択手段
10
7
計測データメモリ
主要部モデル
データベース
6
三次元CAD／CAM
53
入出力装置
55
54
入出力装置
52
1
4
3
光造形装置
演算処理手段
ディスプレイ
2
計測手段
入力手段
5

[Drawing 14]



[Translation done.]